

What is claimed is:

1. A linear guide device comprising:

a guide rail extending in an axial direction and having  
a first raceway groove extending in the axial direction;, and

5 a slider having a second raceway groove opposed to said  
first raceway groove of said guide rail and being supported  
by said guide rail in such a way as to be able to move along  
the axial direction through rolling of a large number of rolling  
elements inserted between said first and second raceway grooves,

10 wherein at least one of said first raceway groove of said  
guide rail and said second raceway groove of said slider is  
formed by rolling, and

wherein a depth  $D_g$  of said raceway groove, which is formed  
by rolling, is set so that a ball diameter ratio ( $D_g/D_w$ ) obtained  
15 by dividing the depth  $D_g$  by a diameter  $D_w$  of each of said rolling  
elements ranges from 0.26 to 0.45.

2. The linear guide device according to claim 1, wherein  
a surface of at least one of the guide rail and the slider whose  
20 raceway groove is formed by rolling is subjected to removal  
of a decarburized layer.

3. A method of designing at least one of raceway grooves  
of a guide rail and a slider of a linear guide device, which  
25 is to be formed by rolling by using a rotary die having a

projection-shaped working portion, whose shape is matched to a shape of the raceway groove on which rolling elements roll, the method comprising:

setting a depth of the raceway groove to be rolled, so  
5 as to have a value determined by allowing for an error in shape  
of the raceway groove, which is caused by the rolling.

4. The method according to claim 3, wherein a depth  $D_g$  of the raceway groove to be rolled is set so that a ball diameter ratio ( $D_g/D_w$ ) obtained by dividing the depth  $D_g$  by a diameter  $D_w$  of each of said rolling elements ranges from 0.26 to 0.45.  
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5. A method for forming at least one of raceway grooves of a guide rail and a slider of a linear guide device, the method  
15 comprising:

preparing at least one rotary dies including a projection-shaped working portion, whose shape is matched to a shape of the raceway groove on which rolling elements roll; and

20 rolling the raceway groove on a blank material of at least one of the guide rail and slider having the raceway groove to be rolled by the rotary dies, so that a ball diameter ratio ( $D_g/D_w$ ) obtained by dividing a depth  $D_g$  of said raceway groove, which is formed by rolling, by a diameter  $D_w$  of each of said  
25 rolling elements ranges from 0.26 to 0.45.

6. The method according to claim 5, further comprising:  
removing a decarburized layer from a surface of at least one  
of the guide rail and the slider which has the raceway groove  
5 to be rolled.